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ABSTRACT

At a time when demands on medical education institutions are changing and expanding, instructional development provides a problem solving approach which identifies student needs, determines an appropriate instructional process for satisfying those needs, and defines an evaluation process to measure outcomes. This requires a statement of existing problems, goals, student characteristics, and media resources. Based on this data, a prototype instructional system can be designed, implemented, and evaluated. This monograph provides a schematic presentation of the process, and discusses the organizational, staffing, equipment, and space requirements involved. (EMH)

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instructional development unit

A Guide to Organizing an Instructional Development Unit in HEALTH SCIENCE EDUCATIONAL INSTITUTIONS

by James S. Waldron, Ph.D.
Director, Division of Educational Communications
Upstate Medical Center, Syracuse, New York

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About the Author

Dr. James S. Waldron is Director, Division of Educational Communications, and an Assistant Professor of Administrative Medicine at the State University of New York, Upstate Medical Center, Syracuse, New York 13210.

Dr. Waldron was born in New York City in 1941. He received an A.A.S. in electronics from Westchester Community College, a B.S. in Secondary Education from S.U.N.Y. at New Paltz, an M.S. Ed. in Instructional Technology from Syracuse University and a Ph. D. in Instructional Technology from Syracuse University. His areas of specialization include Instructional Development and Educational Research and Evaluation.

Preface

This monograph is designed to supply the reader with a general understanding of Instructional Development: what it is, how it works, and what people and facilities are required for developing it on any campus.

This monograph is not intended as an in-depth treatment of the subject of Instructional Development, but it should provide one with a working knowledge of how to go about initiating an Instructional Development program.

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RATIONALE FOR AN INSTRUCTIONAL DEVELOPMENT UNIT

In general, the state of medical and health professions education can best be described by the word *change*. Both external pressures and internal demands are bringing about changes in educational practices and methodologies.

The Millis Report, the Carnegie Commission Report, and the Coggeshall Report all emphasize that changes in medical and health profession education must be coordinated with changes in the pattern of health care delivery. All of these reports stress increasing individual health and health care expectations, increasing use of technology and new equipment, and increasing use of a team approach to health care delivery. These factors clearly point out the need for more physicians and health personnel. The implications for medical and health professions education are (1) a need for increased enrollments, (2) reduced required program time, and (3) increased professional education programs.

In addition to the above considerations, programs are being adapted to increase minority group enrollment as students in medical and health-related professions. These programs, when viewed in conjunction with the recommendation for increasing

> . . . student options so that basic training in health-related sciences can lead on to training for a variety of health-related professions as well as medicine and dentistry...,*

further accentuate the difficulties that confront medical and health professions education.

Thus, the questions for medical and health professions are: (1) How does one set about the task of developing the necessary educational programs and methodologies to meet the challenges, especially in view of decreasing funds and increasing faculty-student ratios?; (2) How can a curriculum, course, or program be developed that will be responsive to the need for increased flexibility in the time required for completion, the content, and the applicability to other health professions?; (3) How can increased

* A Special Report by Carnegie Commission on Higher Education, *Higher Education and the Nation's Health*, McGraw-Hill Book Company (New York) 1970.

enrollment occur simultaneously with increased curricular responsiveness to individual student background, preparation, and learning skills?

All of these questions have two things in common: a need for a systematic developmental process that will be responsive to all variables and constraints, while at the same time focusing on and providing the means for specifying the necessary goals and objectives; and a focus on what the student is learning, how one knows when he has learned it, and how one can maximize the effectiveness and efficiency of his learning.

There are a large number of skills, procedures, and practices that can and should be brought to bear on the development of educational programs. They have been coordinated into a general problem-solving process that focuses on the development of effective and efficient instructional programs: effective in the sense that the skills, knowledge, and attitudes that are identified as the objectives are indeed attained; efficient in the sense that given all the factors of money, time, facilities, and resources, the resulting program provides the most learning for the least cost.

Definition of Instructional Development – This problem-solving process is called Instructional Development (ID). It has as its focus the identification of instructional problems or needs and the formulation of instructional solutions. ID is a systematic process for specifying and using relevant instructional objectives for the design of effective and efficient teaching-learning activities. Instructional Development has, generally speaking, three areas of concern: (1) the determination of what the student needs to learn, (2) the development of a process by which the student may learn, and (3) the evaluation of whether or not learning has occurred. The Special Media Institute (SMI), a Federally funded consortium for the identification of an ID procedure, included the following steps:

1. Definition and analysis of the instructional problem.
2. Organization of management resources.
3. Identification of behavioral objectives and performance measures.
4. Specification of methods.
5. Construction of prototypes and evaluation design.
6. Try-out of prototype.
7. Analysis of try-out results.
8. Decision concerning consequent steps.

J. R. Nord* describes the difficulty in defining Instructional Development in any meaningful way. I strongly recommend the article for those who would like a broader and more in-depth definition. For the purposes of this monograph, I will focus on a programmatic definition of Instructional Development. More specifically, I feel that by defining Instructional Development as a process or program of action, an understanding of some of the factors that are involved can be gained. This understanding will be the basis for my discussion of what an ID unit is, what its purposes are, and what resources are required for it to function.

The following description for an Instructional Development process relates one possible method of using a systematic approach to aid in the production of a self-instruction learning program that is prescribed, mediated, and validated for each student. It is of necessity very general, but hopefully designed to communicate a broad comprehension of the Instructional Development process.

* J. R. Nord, *A Search for Meaning*, (AVI, December, 1971).

THE INSTRUCTIONAL DEVELOPMENT PROCESS

(The following description parallels the flow chart in Figure 1).

I. PROBLEMS AND NEEDS

A. The definition of problems in our instance is based on the desire of society for more and better-prepared medical and health practitioners. A more specific definition of the problem would be made within the framework of a health education institution, i.e. medical college, school of nursing. For example, a medical college has as one of its goals the preparation of doctors. The problem is to educate students to meet some set of criteria within the constraints of available resources. A definition of the problem would include general information about some of the following instructional factors:

1. Personnel (How many, what capability?)
2. Facilities (What kind, quality, availability?)
3. Budget (How much, under what constraints?)
4. Time (How much? Degree of flexibility)

B. The learner's needs must be determined to insure that a program does accomplish its tasks of providing an environment in which the learner will indeed be able to meet the program objectives, more specifically, to learn.

II. GOALS, STUDENT CHARACTERISTICS, MEDIA

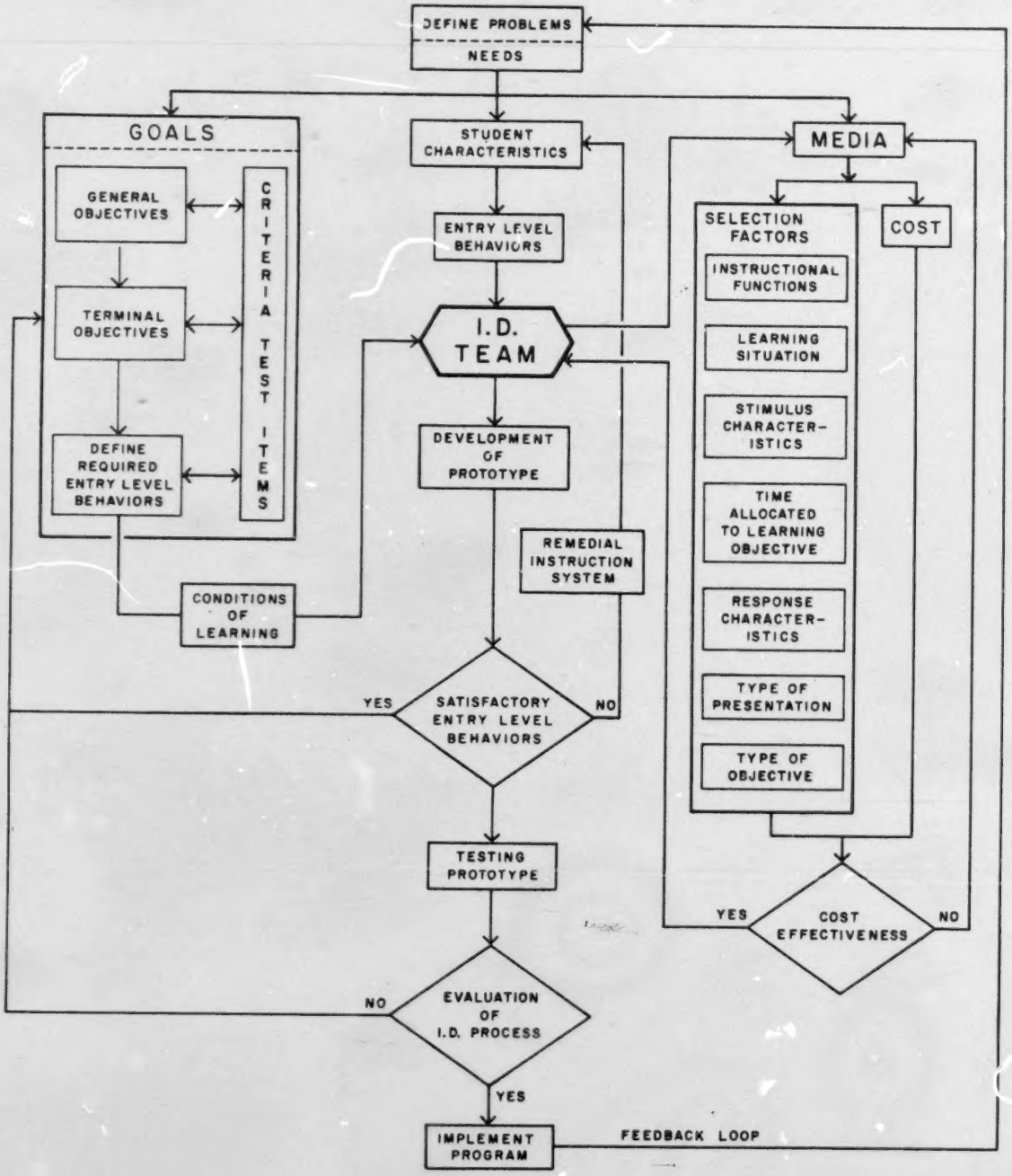
These indicate the next three phases in the process. All are equally important and represent processes that will go on simultaneously. The selection and identification of goals, the assessment of student characteristics, and the selection of media form a relationship within which each activity is functionally necessary for the other.

It is critical to the learning process that answers to the following questions be found:

1. What is it that the student must learn?
2. How will we know when the student has learned it?
3. What instructional methods and procedures will best provide the environment for the desired learning?

An institution, a department, or a teacher must know where he wants to go in order to make decisions about how best to get there and how to determine when he has arrived. Learning that is based on random decisions will be random in nature. This randomness will make evaluation a meaningless effort.

Figure 1 – INSTRUCTIONAL DEVELOPMENT PROCESS



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A. GOALS

The formulation of goals stems directly from the definition of problems and description of needs. In this instance, the problem may be a lack of sufficient and adequately prepared health personnel. The specific institutional need is, within its resources, to produce the required health practitioners. This need is translated into the general objectives for the learner which he is required to meet in order to become a doctor, nurse, or dentist. The goals of the institution might be to produce doctors who can take patient histories, do examinations, make diagnoses, select necessary lab tests, etc.

An example of some general objectives for the first year of medical school was published in *Teaching and Learning in Medical School** and includes the following:

1. To stimulate a continuing interest in the study of the basic sciences by demonstrating the integral part they play in the care of the patient.
2. To maintain the student's enthusiasm for learning about people and to emphasize the importance of personality factors in medicine.
3. To provide first-hand observations of the effects of the course of the illness upon a patient and his family, and not just the isolated period of hospitalization. This, in turn, will give a much more realistic approach to therapy and prevention of illness.
4. To develop within a student the concept that the patient's illness not only affects, but is affected by, the family.
5. To present an excellent opportunity to study the effects of pregnancy and births upon the family and to observe the physical and emotional development of children.
6. To provide opportunities for the student to observe many of the factors in the home which may lead to physical or emotional illness, and thereby to obtain direct experience in preventive medicine and the maintenance of health.
7. To help overcome the anxiety and insecurity felt by many students in their contacts with patients.
8. To aid and guide the student as he learns, through personal experience, the close relationships which exist between the patient and physician and how to deal with the feelings of his patients as well as his own in the patient-physician relationship.
9. To learn the difficult technique of history taking in order to appreciate the full significance of all aspects of the patient's history.

When an individual student can meet all of the goals of the institution, he can be considered to have completed the program.

Goals are general statements of purpose and do not specify the conditions or criteria that are necessary for their attainment. As we can see from the above list, there are certainly many goals that an institution would define as being necessary for the preparation of a physician. For example one goal might be:

Goal – to acquire an understanding of clinical problem solving.

Many general objectives could then be derived from this goal. One might be:

General Objective – to acquire a knowledge of lab tests, patient examination techniques, and normal human physiology that relate to diagnosing anemia.

In order for this to qualify as a general objective, we must be able to write a behavioral statement (terminal objective) that states exactly the performance, conditions of

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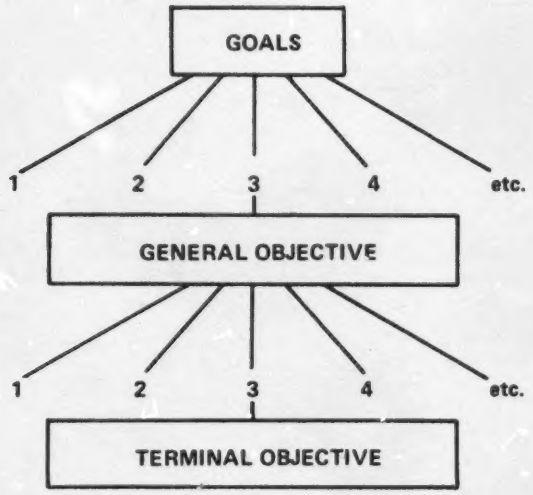
* G. E. Miller, et al., *Teaching and Learning in Medical School,* The Commonwealth Fund Book, Harvard University Press (Massachusetts 1961) pp. 90, 91.

performance, and level of performance for a student meeting the requirements of the general objective. For example:

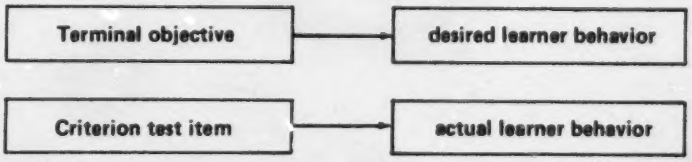
Terminal Objective – When presented with a patient who has anemia, the student will do a complete physical examination, identify all the relevant symptoms, make differential diagnoses, order all the necessary lab tests and make a correct specific diagnosis.

In summary, goals are clarified by defining what general objectives must be met for goals to be achieved. A determination of necessary skills, attitudes, and knowledge is made in order to define terminal objectives. These goals and objectives form a behavioral hierarchy. (see Figure 2)

Figure 2 – BEHAVIORAL OBJECTIVES HIERARCHY



Criteria Test Items – From the behavioral hierarchy, criteria test items are developed. These are test items that will yield a valid indication of a learner's ability to meet an instructional objective. In order to determine whether a specific instructional process has been effective, teachers must translate their terminal objectives that describe the sought-after learner behavior into test items that require the student to exhibit this behavior.



When the desired and the actual learner behaviors match, then the instructional process can be considered to have functioned as intended.

The establishment of a behavioral hierarchy also aids in the identification of entry level behaviors. Entry level behaviors are those skills, knowledges, and attitudes that are required of any student for starting an instructional unit. A student must have these basic prerequisites as a basis on which he can build additional learning as defined by the unit's objectives. By specifying entry level behaviors, one is able to identify those students who have some deficiency that must be remedied in order for them to successfully move towards meeting the objectives of the learning unit.

The information acquired by specifying the conditions necessary for desired types of learning to take place, ordering the objectives into a behavioral hierarchy, and developing the criteria test items for measuring each behavioral objective, is collected by the Instructional Development team.

B. STUDENT CHARACTERISTICS

The process of assessing student characteristics is a vital part of the Instructional Development Process. Each student should be processed through a series of evaluation functions in order to determine where he is in relation to the behavioral objectives hierarchy and whether or not he has the minimum skills required to begin the sequence. The student is evaluated in terms of (1) Knowledge (Does he possess the facts and skills he will need to begin the program or course?); (2) Communication Tools (How well does he speak, listen, read, and write?); (3) Affective Qualities (What are his attitudes towards people and work assignments? What subjects and activities interest him? What kinds of reinforcements motivate him?); and (4) Learning Styles (Through which sense or combinations of senses does he best receive information? Does he use the same style for giving information?). Here, the senses are defined as being *Visual* (i.e., print, graphics, slides), *Auditory* (i.e., tape, record, lecture), *Tactile* (i.e., manipulation of objects, palpation), *Kinesthetic* (i.e., roleplaying, dance, body gestures), and *Combination* (i.e., videotape, T.V., live drama, sound films).

Entry Level Behaviors – All of the above data that have been collected concerning each student are brought together and processed. It is at this point that we can use the pertinent information in determining whether or not the student has the minimum prerequisites he needs to start the learning sequence. The student's actual entry level behaviors are compared with the defined required entry level behaviors and a decision is made whether or not the student's entry level behaviors are satisfactory or unsatisfactory. If the student meets the minimum requirements, then an appropriate starting point in the program or course is determined. If the student does not meet the minimum requirements, he enters the Remedial Instruction System.

Remedial Instruction System – All the information gathered concerning the student is reprocessed and an individualized learning sequence is prescribed to bring his entry level behaviors up to the minimum required level. The Remedial Instruction system is identical to the Instructional Development process. The same procedures and activities are used in an effort to enable the student to move from entering behavior to terminal behavior. In remedial instruction, however, the terminal behavior is the required minimal entry level behavior of the total program. For example, if a student has met all the entry requirements for medical school except for communication skills, a remedial learning sequence should be used to bring his communication skills to entry level as defined by the institution.

At this point in the process, the information gathered by the Instructional Development Team during the **GOALS** selections and the **STUDENT CHARACTERISTICS** assessment activities will provide the basis for the selection of media.

C. MEDIA

Media is defined as "The physical means of presenting stimuli." Equipment, instructional materials, and the teacher are included in this definition.

> Mediation (the process of creating the total learning environment) is based on three general principles: (1) No single medium is likely to have proper ties that make it best for all purposes – there is, as far as we know, no special magic in any particular medium; (2) The most important single criterion for choice of medium is often the nature of the learning task itself . . . that is, the objective of the instruction; (3) The precise answer to the question of which medium is not to be found by matching courses with media, or even topics with media, but rather in matching specific instructional functions with media.*

Briggs *et. al.* (1967) point out,

> . . . there is seldom any one way to present a very lengthy sequence when all factors that are known, relating to learning conditions and practical constraints, have to be viewed in a trade-off fashion. Nevertheless, the closer the final media choices can adhere to the media shown in the media programs for the individual objectives, the greater the likelihood that the result of the analysis will be a multi-media package of significantly greater effectiveness than could be achieved by a less systematic approach to the design of instruction.**

Selection Factors – The Instructional Development team, using data it has collected, specifies media for each behavioral objective. The process of mediating the learning sequence will be based on an assessment of the selection factors. Decisions concerning mediation will be based on the: (1) instructional functions to be performed, (2) learning situation, (3) stimulus characteristics, (4) time allocated to the learning objective, (5) response characteristics, (6) type of presentation, and (7) type of objective. In addition, the factors of personnel, facilities, budget, and time must play a major role in the decision concerning the mediation of an instructional program. Once a match between objective and media has been accomplished, the final decision of total course or instructional unit mediation can be made.***

Cost Effectiveness – When selecting media, several alternatives are considered. The question, "Are we getting the maximum effectiveness for minimum cost?" is asked. If the answer is "No," then it is necessary to go back through the process until the best alternatives are selected. When the answer is "Yes," the information concerning what media and what process of mediation are to be used is gathered by the Instructional Development team. The ID team will process and synthesize all the information it has collected. The decisions made by the team will become the guidelines for the development of the instructional unit, course, or program to be used.

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* Robert Gagné, *Learning Theory, Educational Media and Individualized Instruction* (U.S. Office of Education, University of California at Berkeley) 1967.

** L. J. Briggs, *et. al. Instructional Media* (American Institutes for Research, Pennsylvania) 1967.

*** This process is fully described in L. J. Briggs, *Handbook of Procedures for the Design of Instruction,* (American Institutes for Research, Pennsylvania) 1970.

III. DEVELOPMENT OF PROTOTYPE

At this point, the specification of goals and specific objectives has taken place, an assessment of student characteristics has been made, and the media and process have been selected. Based on this data, the instructional material to be used is developed, the learning environment is selected or designed with all requisite AV equipment, and the total instructional process is established. If a seminar is decided on as the best way to move the student from entry level behaviors to terminal objectives, then all aspects of the seminar are identified, including faculty-student interaction.

IV. TESTING OF PROTOTYPE

The developed instructional unit is tested and evaluated in terms of the specified objectives for the unit. The questions "Does it effectively move the learner from his entering behavior to the desired terminal behavior?" and "Is the total instructional unit functioning as best it can?" are asked. In addition to evaluation in terms of student achievement, the whole unit is evaluated in terms of efficiency, cost, and time.

V. EVALUATION OF ID PROCESS

The ID process evaluation involves determining whether the instructional unit was successful in enabling the learner to achieve the unit objectives. If these objectives have been stated clearly, then evaluation is not only a possible, but a relatively easy, task. If the objectives have not been stated clearly, then evaluation becomes very difficult, if not impossible. In Instructional Development, evaluation is focused not only on student performance, but more importantly, on the instructional process. More specifically, ID evaluation focuses on the success of the instructional unit or process and not simply on the success of the student. It is assumed that all students will be able to meet all of the unit objectives. Achievement becomes a constant and the time taken to meet the objectives by any one student is the variable.

If all students, after completing the unit, do not meet the specific objectives, then a determination of the cause must be made. Unsuccessful student performance could be caused by (1) inadequate entry level behaviors, (2) unrealistic specific objectives, (3) unsuccessful remedial instruction, (4) improperly selected or designed instructional materials, (5) insufficient time for learning, and (6) insufficient motivation.

Based on the information resulting from the evaluations of the ID process, changes are made in the instructional unit; if evaluation indicates general success, a decision to implement the program may be made.

In summary, this detailed discussion of an Instructional Development process represents the ideal. All of us must function in the real world where the constraints of time, people, money, and facilities require that we do something that will meet our needs in our situations. The process, despite the use of an ideal description, presents us with the tools and techniques for improving the quality and effectiveness of the instructional programs in our respective institutions. The Instructional Development process presents us with a systematic procedure that can be used to design instructional programs that increase student-faculty interaction and that are based on each student's needs, abilities, and interests.

Instructional Development procedures lead to decisions concerning the design of instructional programs that are based on guidelines supported by research on learning. Some of these guidelines are: (1) *Motivation* – students are more efficient if they want to learn, (2) *Activity* – learning is an active, not a passive, process – what the student does is generally what he learns, (3) *Practice* – provisions must be made for practice of newly acquired behaviors, (4) *Modeling* – student learning is enhanced when students are shown models or examples of the behavior that they are expected to reproduce, (5) *Clues* – clues or prompts help student learning to be more efficient, (6) *Prerequisites* – students must have all the required skills to begin an instructional unit if they are to be successful, (7) *Sequencing* – student learning is facilitated when content is organized from the simple to the complex, from the familiar to the unfamiliar.

The Instructional Development process focuses on student learning by aiding in the design of a total learning environment that will enable the student to achieve the stated objectives.

SERVICES AND CAPABILITIES OF THE UNIT

An Instructional Development Unit has as its purpose the improvement of teaching-learning activities. This improvement is gained through the use of a variety of procedures and practices that are implemented within a framework where a statement of a real need is made, the need is translated into specific educational objectives, real world constraints are defined, alternative educational paths are generated, and the selection of the best alternatives is made based on critical evaluation.

Specific services provided by an Instructional Development Unit include (1) consulting with faculty, students, and administration in identifying instructional needs, (2) helping specify and ascertain educational priorities and student expectations, (3) helping clarify project goals, (4) helping determine resources that can be made available for the project, (5) helping establish procedures for determining student achievement and background, (6) working with faculty (content specialists in identifying specific project objectives, (7) helping develop the instructional format that will be used, (8) designing criteria tests based on the specified objectives, (9) identifying existing instructional materials when possible, (10) designing and developing required instructional materials, (11) evaluating both existing and locally produced materials, (12) coordinating all resources, materials, facilities, and people, (13) developing and implementing the complete evaluation procedures for the project, (14) interpreting evaluation data, and (15) coordinating revision activities.

Consultation activites may include seminars and workshops that are designed to familiarize faculty, administration, and students with Instructional Development processes, the Systems Approach, use of behavioral objectives, potential of criterion referenced evaluation vs. normative referenced evaluation, the use and operation of AV equipment as a means of improving teaching, and research in the psychology of learning.

Efforts in the area of setting educational priorities and determining student expectations should include review of community needs and development of specific instruments for gathering the needed data.

The Instructional Development staff should pull together the relevant research findings when possible, use psychological theory where necessary, and employ a combination of experience and logic when established facts and developed theory are not available.

ORGANIZATIONAL STRUCTURE

There are many, if not an infinite number, of possible organizational structures that will function well. The specific form is not the major concern as long as certain criteria are met. These criteria are best defined in terms of the replies to the following questions:

1. At what administrative level should the program be organized?
2. Should all audiovisual activities be administratively centralized?
3. What should be the relationship of the program to the medical library, resource center, computer center, print shop, etc.?

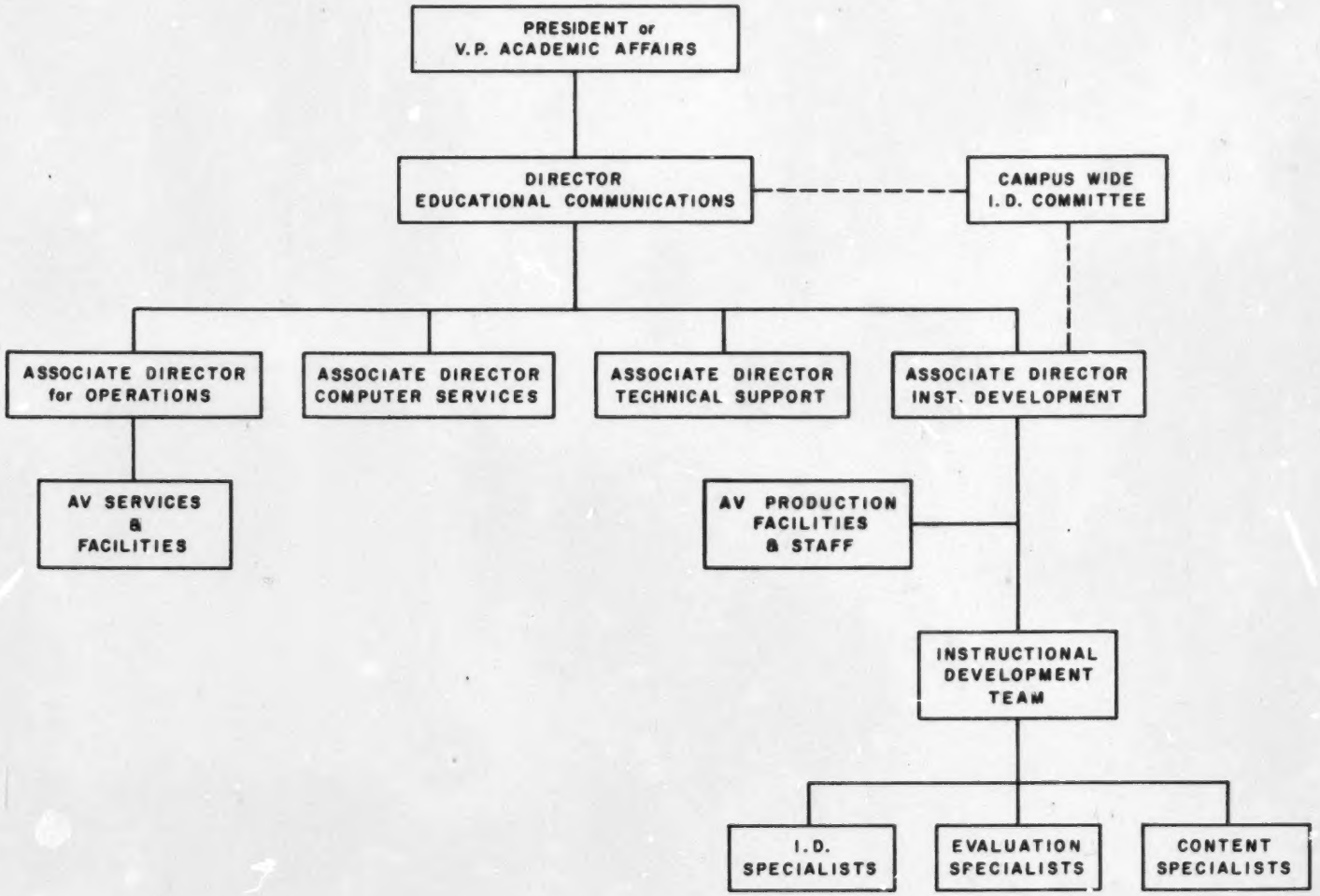
An Instructional Development unit depends on the Educational Communications program for support. The following flow chart represents one possible configuration. (see Fig. 3).

Instructional Development units need to be a part of Educational Communications programs that are prepared to meet today's challenges by developing into centers for innovation and diffusion within their institutions. It is within this context that the above questions are answered.

1. If a communications program is to succeed in the innovation and diffusion of Instructional Development, research, and evaluation, its director must be in an administrative position that insures maximum independence from specific departments and colleges within the health science center. He must also be in a position within the academic hierarchy that assures his full participation in those standing committees that concern themselves with curriculum, evaluation, instructional alternatives, and educational policy. These conditions necessitate that the director of the communications program be administratively responsible directly to the president of the medical college or to the vice president for academic affairs of the health science center and that he hold academic rank equivalent to that of an academic department chairman.

2. Success in accomplishing any task is directly related to having the necessary resources and the administrative responsibility for the allocation of such resources. Therefore, the director of the communications program must have administrative control over these service facilities and those educational resources that are necessary for the attainment of program objectives. Portions of these resources may be allocated to specific functions or departments wherever necessary, but residual centralized control must reside with the director. It is not possible to develop a cost-effective program in a situation where necessary resources are not centrally administered.

Figure 3 – EDUCATIONAL COMMUNICATIONS PROGRAM



3. The relationship of the communications program to other programs (medical library, computer center, print shop, etc.) will be dictated by the goals and objectives of a given instructional development program. All programs within any institution provide facilities and services that are necessary to that institution as a whole. The relationship among these programs should be one of joint cooperative effort in project completion. The overall priorities of the various educational projects will be assigned by an Instructional Development Committee. This committee should be a cross section of top administration, faculty, students, community interest groups, and the director of the communications program.

In summary, the educational communications program should have those responsibilities, controls, and capabilities that will enable it to accomplish its overall mission. This requires high placement of the program in the administrative structure of the institution, responsibility for all the required resources, and most important, a very high degree of participation in curriculum decision-making functions. In addition to these parameters, the following recommendations are made:

1. The major function of the communications program should be Instructional Development.
2. The director of the communications program should be provided with discretionary funds to be used for Instructional Development projects.
3. The chief administrator of the medical center should mandate the establishment and development of Instructional Development programs.
4. Long-range planning for Instructional Development should be done at both the medical center and college levels.
5. The faculty record system should give appropriate credit toward promotion and salary increase to faculty members who participate effectively in Instructional Development projects.

STAFFING REQUIREMENTS AND POSITION DESCRIPTIONS

For optimal performance, an Instructional Development Unit requires the professional services of ID specialists, evaluation specialists, content specialists, and a variety of supporting staff, such as secretaries.

The following position descriptions will serve to provide an outline of the level and function of key personnel in an Instructional Development unit. An institution may have more than one individual in any one of the outlined positions. The actual number of staff will depend on the scope of the Instructional Development program and the level of support available for it. (See Fig. 4).

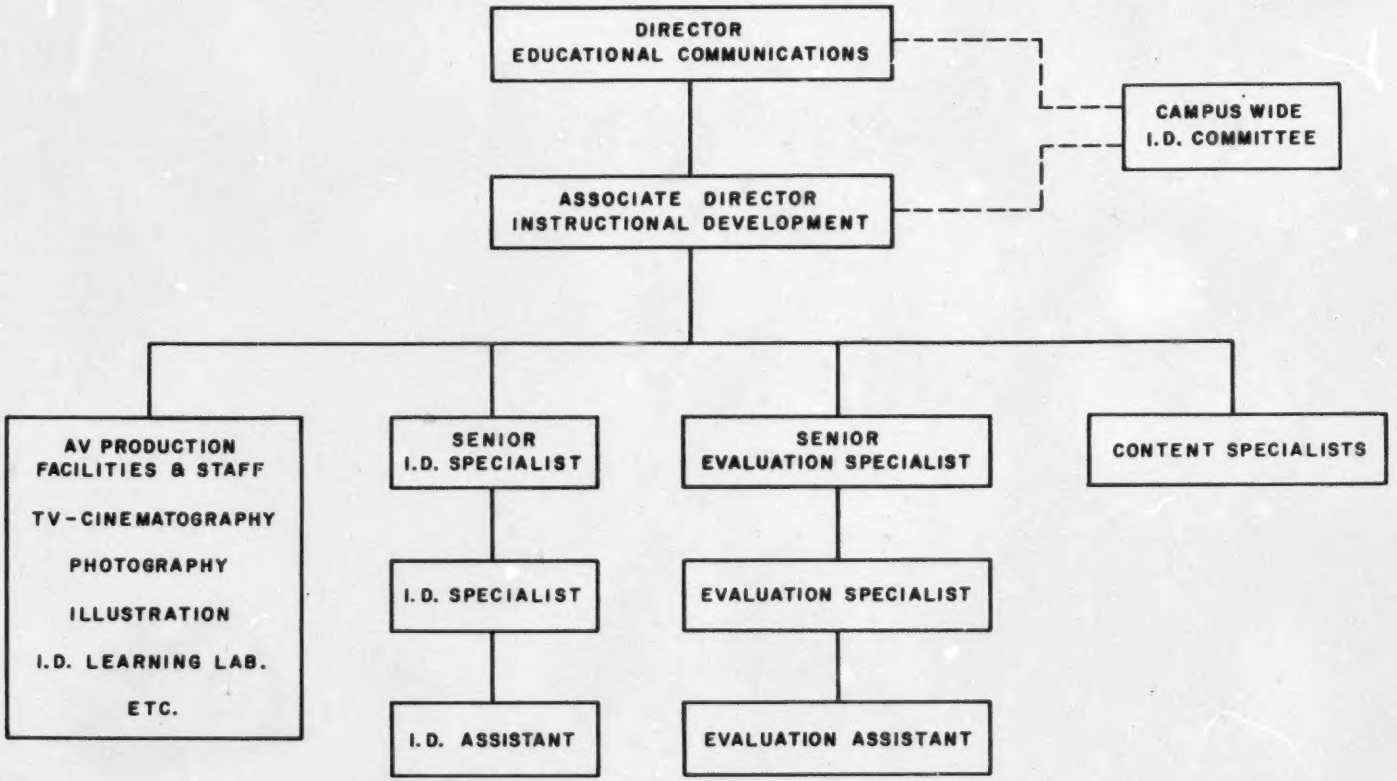
POSITION DESCRIPTIONS

ASSOCIATE DIRECTOR, INSTRUCTIONAL DEVELOPMENT: He reports directly to the Director of Educational Communications. He is responsible for the administration of all the Instructional Development projects in the institution. He sits with the Director on the Campus Wide Committee on Instructional Development and works directly with administration, faculty, and students in the assessment of educational needs and the selection and specifications of Instructional Development projects. He works with the content specialists in the delineation of behavioral objectives for the projects. This includes the development of project proposals for the purpose of seeking external funding from private and public sources. He is responsible for the development and evaluation of instructional practices and procedures. He must analyze and evaluate academic programs and be able to translate the gathered data into recommendations for specific instructional improvements.

The Associate Director, Instructional Development is responsible for the preparation of an annual budget and for all budget allocations and expenditures. He must also supervise and coordinate the activities of the Instructional Development staff.

The Associate Director, Instructional Development must have a Ph. D in Instructional Technology or Learning Psychology plus a minimum of three years experience as an Instructional Development specialist in Health Science education. The salary range is generally over $15,000.

Figure 4 – BASIC INSTRUCTIONAL DEVELOPMENT UNIT



SENIOR INSTRUCTIONAL DEVELOPMENT SPECIALIST: He reports directly to the Associate Director, Instructional Development. He is responsible for directing specific major Instructional Development projects. These projects include the development of instructional materials, as well as the design of learning environments. He functions as the head producer and coordinator of the development, production, and utilization of all instructional materials. He coordinates the Instructional Development team which consists of an Instructional Development Specialist, an Evaluator, and Content Specialists. He works directly with the heads of the production units in establishing production time-lines.

The Senior Instructional Development Specialist should have at minimum a Master's Degree in Instructional Technology, plus 5-10 years of experience in educational communications, three years of which should have been spent as a media specialist in the development of a variety of instructional materials. The salary level is generally $15,000 or more.

INSTRUCTIONAL DEVELOPMENT SPECIALIST: He reports to the Senior Instructional Development Specialist and is responsible for direction of specific aspects of projects relating to self-instruction facilities and instructional materials development. He works in conjunction with the Evaluation Specialist and Content Specialist. He must be able to assume the responsibility for producing and coordinating instructional development programs under the supervision of the Senior Instructional Development Specialist.

This position requires a Master's Degree, 2-5 years experience in the field of educational communications, and at least one year's experience in developing materials for use in Health Science education. The salary level is $10,000-$15,000 per year.

INSTRUCTIONAL DEVELOPMENT ASSISTANT: He reports to the Senior Instructional Development Specialist and is assigned duties on specific Instructional Development projects.

This position requires at least a Bachelor's Degree with emphasis in the sciences. Prior experience is necessary. The salary range is generally $7,000-$10,000 per year.

SENIOR EVALUATION SPECIALIST: The Senior Evaluation Specialist reports to the Associate Director, Instructional Development. He is responsible for managing the evaluation and measurement aspects of specific Instructional Development projects and for working closely with the ID team in designing, developing, and implementing evaluation procedures. He is responsible for collecting, collating, and translating data into guidelines that form the basis for determining student learning characteristics, project performance, and general policy concerning implementation and/or revisions.

The Senior Evaluation Specialist must have a complete understanding of project goals and priorities. He must be competent in theory of measurement and testing, statistical analysis, experimental design and research, theory and method of design, development of instructional materials, and interpersonal communication skills.

The Senior Evaluation Specialist must have a Ph. D in Evaluation with a concentration in Instructional Development, plus a minimum of 3 years experience. The salary range is over $15,000.

EVALUATION SPECIALIST: The Evaluation Specialist reports to the Senior Evaluation Specialist and is responsible for the development of specific evaluation methods and instruments as they relate to a project. He must be able to assume the responsibility for assigned evaluation tasks in collecting and analyzing data. This position requires a Master's Degree in test and measurement, with 2-5 years experience in evaluation responsibilities relating to Instructional Development. The salary level is $10,000-$15,000 per year.

EVALUATION ASSISTANT: The Evaluation Assistant reports to the Senior Evaluation Specialist and is assigned to specific data collection and tabulation tasks. This position requires a Bachelor's Degree with emphasis in statistical measurement. The salary range is $7,000-$10,000 per year.

SPACE AND EQUIPMENT REQUIREMENTS

The space and equipment requirements of an ID unit are not extensive. I will assume that general office space and conference rooms for the ID staff are self-explanatory. Additional space should be dedicated to developing an experimental Independent Learning Laboratory. This Learning Lab will be the preliminary testing ground for materials and procedures that are developed by the ID unit. This facility will make possible experimentation in independent self-instruction techniques and controlled evaluation of instructional programs. After new materials and procedures have been validated, they will be relocated into other learning areas on the campus. The Learning Lab will also be a testing ground for experimenting with new learning space configurations, learning environment variables, and AV equipment.

The size of the Learning Laboratory and required equipment is dependent on the scope of the ID effort. A basic Learning Laboratory should be designed on the principles of flexibility and simplicity.

A minimal facility that would handle 15 students at a time requires approximately 350 sq. ft. and the following basic equipment:

15 Study Carrels with Projection Screen
15 Chairs
15 Audio Cassette Playback Units
15 Headsets
15 35mm (2"x2") Automatic Slide Projectors
2 Audio Cassette Player/Recorder Units
2 16mm Motion Picture Projectors
5 Super 8mm Motion Picture Projectors (silent)
2 Super 8mm Motion Picture Projectors (sound)
1 Audio Cassette Duplicator with 2 slaves

The experimental learning lab should be easily accessible, have adequate sound and light controls, and have an adequate number of electrical outlets (110V.) All of the carrels in the learning lab can be used with any of the recommended equipment. The stress is on creating a facility that is based on commonly available equipment that uses basic media formats and that does not depend on any one hardware format or vendor of instructional materials.

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